



Docket No.: 360842010500
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Kazutaka KUSANO et al.

Application No.: 10/631,851

Confirmation No.: 9161

Filed: August 1, 2003

Art Unit: 1714

For: PASTE INCLUDING INORGANIC POWDER,
METHOD FOR PRODUCING THE SAME
AND METHOD FOR PRODUCING PLASMA
DISPLAY PANEL MEMBER

Examiner: E. Cain

DECLARATION OF MR. KAZUTAKA KUSANO

MS Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1. I, Kazutaka Kusano, declare that I reside at Otsu-shi, Shiga, Japan, and that I am one of the inventors named in the above-identified U.S. Patent Application. I am, and have for many years been, an employee of Toray Industries, Inc. of Tokyo, Japan. I have been thoroughly familiar with the technology relating to the production of paste for plasma displays since April 1997.

2. I have reviewed the pending final action dated June 6, 2006, and the advisory actions dated October 25, 2006, and December 18, 2006. I have also reviewed and am familiar with U.S. Patent 6,660,184 to Singh et al. (hereinafter Singh), which is the cited reference in the outstanding final office action.

3. As described in the specification of this application, I, together with the listed co-inventors, discovered that, it is possible to produce a paste with a foreign substance content of 15 mg per 20 kg or less, as recited in claim 11.

4. This declaration and the following examples are provided to show that a paste produced using the roll milling methods described in Singh would possess a foreign substance content greater than 15 mg per 20 kg, as claimed in claim 11.

Examples

5. In a 600 ml beaker, 150 g of a blue-emitting PDP phosphor, $\text{BaMgAl}_{14}\text{O}_{23}:\text{Eu}^{2+}$, was mixed with 25 g solvent (terpineol), 5 g of Menhaden fish oil, and 4 g of dispersant (stearic acid or polyethylene glycol) which had been previously dissolved in 16 g of the same solvent. These materials were then mixed for 1.5 hours to form a dispersion of the phosphor. After that, 4 g of a diisobutyl phthalate plasticizer and 5 g of a binder (ethyl cellulose or polyvinyl butyral) were added; the binder having been first dissolved in 25 g of the solvent. The paste was then mixed for an additional 1.5 hours. Pastes were stored in plastic containers with sealed caps. Viscosity was measured using field-type viscometer (Brookfield Co., Ltd., Model DV-1) at 20 rpm. For binder burn-out, 8 g of paste was placed in a glass dish and heated in air at 20 SCFH in a box furnace according to the following program:

Heat at 10 °C/min. to 110 °C

Heat for 1 hour at 110 °C

Heat at 10 °C/min. to 500 °C

Heat for 1 hour at 500 °C

6. The brightness of the phosphor powders were measured before and after the binder burn-out and reported in Table Exp-1 below as percent retained brightness (relative to the brightness of the original phosphor).

7. Paste stability was determined by visually observing the degree to which the phosphor solids became separated from the organic media after the paste had been allowed to stand for a period of time. A paste was deemed to have excellent stability if there was no visible separation of the solids from the organic media after the paste stood for at least 1 month. A paste was considered to have good stability if there was little or no separation of the solids from the organic media after the paste was allowed to stand for at least 1 week.

8. 20 kg of a paste after dispersion was filtered with a disk filter of 293 mm in diameter (filtration pressure: 0.2 Mpa, filter: 500 mesh). Then, the filter was placed in a clean vessel and immersed in clean acetone and washed in an ultrasonic cleaning machine for 30 minutes. After washing, the washing solution was further filtered with a disk filter of 25 mm in diameter (filtration pressure: 0.05 MPa, filter: nylon net [pore size 11 μm]). Then, a precision balance measured the total amount of the foreign substances remaining on the filter.

9. The results are presented below in Table Exp-1 for a sample of each paste composition. Examples 1, 2 and 3 correspond to Examples 1-1, 2-1 and 6-1 respectively in Singh. Examples 4 and 5 correspond to Examples 2-1 and 6-1 respectively after being stored for 1 week and then mixed back by roll-milling for 1.5 hours.

Table Exp-1

Example	Binder	Dispersant	Solvent	Brightness (%)	Viscosity (cps)	Stability	Amount of foreign substances (mg/20kg)
1	PB	SA	T	90	35,000	Excellent	120
2	EC	SA	T	88	59,000	Good	110
3	PB	PEG	T	85	19,000	Good	130
4	EC	SA	T	88	56,000	Good	200
5	PB	PEG	T	85	17,000	Good	230

PB = polyvinyl butyral

EC = ethyl cellulose

SA = stearic acid

PEG = polyethylene glycol

T = terpineol

Experimental Results and Conclusions

10. As shown in Table Exp-1, the Examples and methods disclosed in Singh produce pastes with a foreign substance content significantly higher than 15 mg per 20 kg. Accordingly, one of ordinary skill in the art could not obtain a paste with the foreign substance content recited in claim 11 based on the disclosure of Singh.

11. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed at 1-1, Sonoyama 1-Chome, Otsu-shi, Shiga, Japan, this 14th day of Mar., 2007.

Date: Mar. 14, 2007

Kazutaka Kusano
Kazutaka Kusano, Co-inventor